

Aircraft Control Augmentation and Health Monitoring Using FADS Technology, Phase I

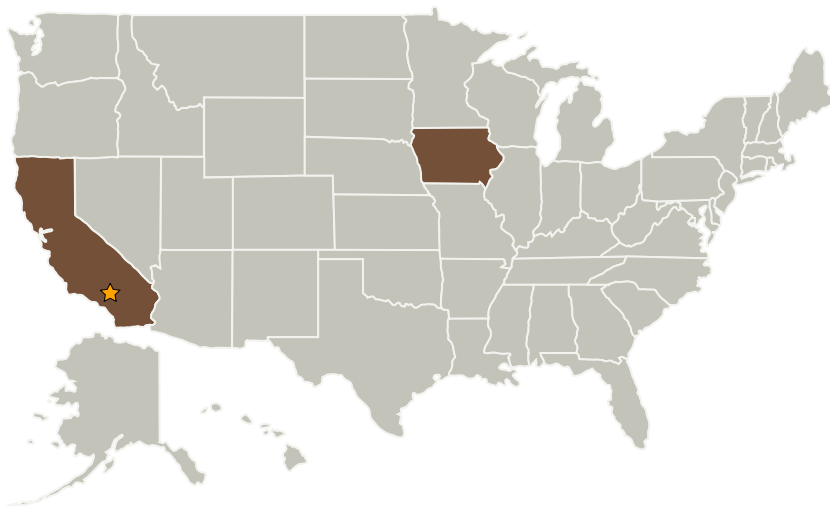
Completed Technology Project (2006 - 2006)



Project Introduction

This Phase I research proposal is aimed at demonstrating the feasibility of an innovative architecture comprising control augmentation and on-line health monitoring system. This architecture integrates Flush Air Data System (FADS) with Reconfigurable Generalized Predictive Control (RGPC) technologies. The Phase 1 effort includes identification and description of all supporting modules, their functionality and associated algorithm structures, connectivity, and final simulations using a specific aircraft for system performance evaluations. Proof-of-concept study will include demonstrating the capability using selected aircraft health degradation and/or failure situations. The concept innovation is derived from the prognostic nature of the system feedback used by the controller for applying corrective aircraft control. In traditional controllers the errant transients possessing loss of control potential are detected after the fact and corrective actions for recovery are commanded by controller posteriori. The proposed system performs a real-time autonomous monitoring of aircraft surface pressure fields that contain precursor information for prediction of incipient errant transient motions. The proposed system will enable reconfiguration of control based on measured pressure field anomalies that indicate standard control system equipment malfunctions.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Vibroacoustics Solutions, Inc.	Supporting Organization	Industry	Boone, Iowa

Primary U.S. Work Locations	
California	Iowa

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX10 Autonomous Systems
 - └ TX10.2 Reasoning and Acting
 - └ TX10.2.5 Fault Diagnosis and Prognosis